

Section 2

Storm Water Quality Considerations during Project Planning

2.1 Introduction

Storm water quality must be considered during project planning (developing the Project Study Report [PSR], Project Report [PR], Project Scope Summary Report [PSSR], and other scoping documents) of all transportation facilities. The primary storm water quality objectives during project planning are to:

- (1) Identify potential storm water quality impacts and develop/evaluate options to avoid, reduce or minimize the potential for storm water quality impacts where practical;
- (2) Ensure that the programmed project includes sufficient right-of-way and budget for required storm water controls;
- (3) Identify project-specific permanent and temporary BMPs that may be required to mitigate impacts.

Table 2-1 summarizes the storm water related activities that should be performed during the development of the PSR, PR, PSSR and other scoping documents, to meet these objectives. The rest of Section 2 explains these activities in detail. When questions arise, contact the District Storm Water Coordinator.

Table 2-1

Storm Water Related Activities during Project Planning (PSR, PR, PSSR, Other Scoping Documents)
Determine potential storm water quality impacts of the proposed project and develop/evaluate options to avoid or reduce impacts
Review requirements from environmental studies to determine if project-specific storm water controls (permanent and temporary) are required
Develop preliminary size, location and cost of permanent treatment controls (infiltration and detention devices) – if needed
Develop planning-level costs for construction site (temporary) BMPs to be incorporated during project construction
Incorporate findings into final report or scoping document

2.2 Defining and Avoiding Potential Impacts

The project planning phase provides the greatest opportunity to avoid adverse water quality impacts as alignments and right-of-way requirements are developed and refined. Section 2.2 provides a basic strategy for identifying and avoiding potential impacts. Avoiding impacts may reduce or eliminate the need for permanent treatment controls and other mitigation-type BMPs. When the refined geometric alignment maps are submitted for right-of-way engineering, the alignment should include sufficient reserved land to construct and maintain all required BMPs at appropriate locations.

2.2.1 Defining Potential Impacts

Table 2-2 identifies many of the project features and potential impacts that should be considered. To the extent it is available, obtain or develop this information for each project or alternative. The Project Engineer must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction, and Maintenance, when necessary. This will usually be accomplished by submitting layouts/base maps, in conjunction with other information required by the functional units, to determine impacts and mitigation requirements (i.e., control measures).

2.2.2 Options for Avoiding or Reducing Potential Impacts

To avoid or reduce potential water quality impacts identified under Section 2.2.1, consider the items listed in Table 2-3.

Table 2-2

Project Features and Potential Impacts to be considered during Project Planning	
Features and Potential Impacts to be Considered	Reason why they must be considered
Identify which RWQCB will have jurisdiction over the project(s). Does the RWQCB have any special requirements?	Requirements may vary by RWQCB. May impact permanent and temporary control requirements.
Identify receiving waters and all other waters that may affect, or may be affected by, the project. Consider aquifers, wells, streams, lakes, reservoirs, wetlands, and waters both fresh and saline. Consider impacts throughout the project lifecycle, including construction, maintenance, and operation.	First step in identifying impacts and potential control measure requirements.
Will construction require work in, above, or directly adjacent to the water bodies listed above?	Could require additional environmental permits/agreements and control measure requirements.
Are any of the receiving waters or watersheds a source for domestic water supplies?	Could require additional environmental permits/agreements and control measure requirements.
Are any sensitive fishery, wildlife, recreational, agricultural, or industrial aquatic resources located in the vicinity of the project?	Could require additional environmental permits/agreements and control measure requirements.
Are any of the receiving waters impaired (303d listed)? (Discharges to impaired water bodies may be subject to strict numeric water quality standards and prescribed treatment controls.)	Supplemental controls may be required to meet further reduce pollutants, meet numeric water quality standards, waste load allocations or requirements of an adopted watershed plan..
What is Caltrans contribution, expressed as a percentage of total flow, to receiving waters that are impaired or "sensitive?"	Used to determine if permanent treatment controls are required.
What is the unit cost for additional right-of-way should it be needed for treatment controls?	Used to determine if permanent treatment controls are required.
Will the project increase the potential for downstream erosion by adding impervious surfaces, decreasing the time of concentration, or redirecting flows?	May need to implement detention devices to prevent damage to off-site streambanks or channels.
Does the project discharge to lined, engineered drainage facilities or unlined, natural channels?	Consideration for implementing detention devices for streambank protection.
Identify general soil types and vegetation within the project site	Basic information needed for slope design and slope protection plans.
How difficult will it be to re-establish vegetation following construction?	
How long will it take for the new vegetation to establish?	
What are the steepest slopes that should be allowed?	
What vegetation, if any, should be preserved?	
Determine the general climate, annual rainfall, and typical seasonal rainfall patterns for the project area.	Basic information needed for slope design and slope protection plans.
Determine the proposed project slopes, and areas of cut and fill.	Basic information needed for slope design and slope protection plans.
Does the project include contaminated or hazardous soils as identified in the initial site assessment (ISA) and environmental documents?	May impact project construction activities and deployment of temporary controls during construction.
Will the contractor's yard be located within the State's right-of-way or otherwise be arranged for or provided by Caltrans? If so, what are the potential impacts?	May impact responsibility for, deployment of, temporary controls during construction.
Do the local regulatory agencies have seasonal construction restrictions?	May impact project construction scheduling and deployment of temporary controls during construction.

Table 2-3

Options for Avoiding or Reducing Potential Impacts during Project Planning			
	Yes	No	Why
Can the project be relocated or realigned, while upholding safe design standards, to avoid or reduce impacts to receiving waters?			
Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?			
Can the horizontal and vertical alignments be adjusted, without jeopardizing safe design standards, to minimize erosion from slopes by:			
Disturbing existing slopes only when necessary?			
Minimizing cut and fill areas to reduce slope lengths?			
Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?			
Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?			
Avoiding soils or formations that will be particularly difficult to re-stabilize?			
Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?			
Providing benches or terraces on long cut and fill slopes to reduce concentration of flows?			
Rounding and shaping slopes to reduce concentrated flow?			
Collecting concentrated flows in stabilized drains and channels?			
Retaining natural vegetation where feasible?			
Can alternative materials or facilities be utilized to reduce future maintenance impacts on water quality (i.e. use of textured concrete in lieu of painted materials)?			
Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?			
Can permanent storm water controls (especially basins) and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?			

2.3 Review Requirements from Environmental Studies to Determine if Additional Project-Specific Controls are Required

During early project planning, storm water activities focused on identifying and avoiding impacts where practical and, if necessary and cost effective, incorporating permanent treatment BMPs into the project that may require additional right-of-way. This identification, avoidance and incorporation process continues in additional detail during the environmental studies phase, to determine if treatment controls or additional mitigation-type BMPs will be required.

A number of standard permanent (design) and temporary (construction site) BMPs are incorporated into all projects as discussed further in Sections 3 and 4 of this Guide. However, issues that may be identified during environmental studies or permit scoping may result in the need for project-specific permanent or temporary BMPs. Table 2-4 describes some of the typical issues that should be considered during the environmental studies phase. These issues are discussed further in the following sections. Much of this information will become available through other technical studies done during the California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) process. Where special water quality issues are present, the designer shall coordinate with District Environmental staff and the District Storm Water Coordinator.

Table 2-4

Environmental or Permit Issues that May Require Project-Specific Permanent BMPs	Environmental or Permit Issues that May Require Project-Specific Construction Site (Temporary) BMPs
Significant, unavoidable impacts to receiving waters	Significant, unavoidable impacts to receiving waters
BMPs to meet a prescribed Waste Load Allocation for an impaired (303d listed) water body	Discharges of dredged or fill material into navigable waters (404 Permit/401 Certification)
BMPs prescribed by a Watershed Plan for an impaired (303d listed) water body	BMPs prescribed by a Fish & Game 1601 Streambed Alteration Agreement
Mitigation measures prescribed by a Fish & Game 1601 Streambed Alteration Agreement	BMPs for stockpiling, handling and transporting contaminated soils
Post-construction dewatering requirements	BMPs and local permits for temporary construction dewatering
Variances for lead contaminated soils, emphasizing the reuse of soils containing aerially deposited lead (ADL) due to vehicle emissions	Project-specific needs for District guidelines for specifying temporary BMPs
Discharges of dredged or fill material into navigable waters (404 Permit/401 Certification)	Potential impacts associated with spills, especially near municipal or domestic water supply reservoirs or ground water percolation facilities
Potential impacts associated with spills, especially near municipal or domestic water supply reservoirs or ground water recharge facilities	
Specific RWQCB requirements	Specific RWQCB requirements

It is important to note that if a project is delayed or pulled, permits can expire and must be re-evaluated, re-issued or renewed. If this occurs, the Project Engineer, Project Manager or the Office Engineer, is responsible for either re-evaluating the project for permit compliance, renewing the permit or obtaining a new permit.

2.3.1 Significant, Unavoidable Impacts To Receiving Waters – Special Circumstances for Considering Treatment Controls

Permanent infiltration or detention devices may be required if the CEQA/NEPA process determines that the project causes significant, unavoidable impacts to receiving waters without incorporation of such controls in the project. Caltrans considers treatment control devices (i.e., infiltration and detention basins) for water quality control, only if all of the following special circumstances are met:

- Runoff from the completed facility will discharge to significant areas of highly valuable habitat in which Federal or State listed aquatic resources have been identified, or will discharge to a storm drain that drains directly to such habitat, and;
- Caltrans runoff constitutes a substantial portion (more than 10%) of the total flow to such habitat.

2.3.2 Discharges of Dredged or Fill Material into Navigable Waters (404 Permit/401 Certification)

Projects that discharge dredged or fill materials into navigable waters are required to obtain a 404 permit from the US Army Corps of Engineers, and a 401 water quality certification from the appropriate RWQCB. Site-specific BMPs may be required for 401 certification to address discharges during construction and operation.

2.3.3 California Department of Fish & Game Streambed Alteration Requirements

A 1601 Agreement is a negotiated, legally binding contract between a project proponent and the California Department of Fish and Game containing measures a project must include to avoid or mitigate adverse impacts to fish and wildlife resources. 1601 agreements are often required for projects conducted in and around lakes, rivers, or streams.

Although lakes and rivers may be easily identified, the Fish and Game definition of a stream can include intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (USGS), watercourses with subsurface flows, and other means of water conveyance that supports aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Project-specific BMPs may be required for asphalt concrete (AC) grindings, chunks and pieces, as described in Project Development Procedures Manual, Chapter 8.

2.3.4 BMPs Prescribed for 303d Listed Waters (Waste Load Allocations and Watershed Plans)

Clean Water Act section 303(d) requires states to identify waters that do not meet State water quality standards even after pollution point sources have implemented required pollution controls. To restore a 303(d) listed water body to state water quality standards, states must establish a Total Maximum Daily Load (TMDL) that allocates pollutant loads among the pollution sources in a watershed. Caltrans will participate in the development of TMDLs and waste load allocations (WLAs) that may affect requirements for Caltrans discharges. Caltrans will implement additional

BMPs if necessary to meet WLAs. Contact the District Storm Water Coordinator to see if Caltrans has identified technologies capable of providing the required level of pollution control.

Where a TMDL has not been developed for a receiving water that exceeds state water quality standards and the receiving water is 303(d) listed or otherwise determined to be impaired, Caltrans will work with and support watershed planning efforts to identify additional controls that may be necessary to prevent or reduce discharges of the target pollutant from the completed project.

2.3.5 Temporary and On-Going Dewatering

The Statewide Permit requires Caltrans to effectively prohibit non-storm water discharges unless the discharge is explicitly exempt or covered under a separate NPDES permit. Exempt discharges fall into two categories: exempt and conditionally exempt. Exempt discharges include diverted stream flows, springs, rising ground waters, and uncontaminated groundwater infiltration, and are allowed unless identified as a source of pollution. Conditionally exempt discharges are allowed if they are identified as not being a source of pollution, appropriate BMPs are developed and implemented, and the appropriate RWQCB is notified. Monitoring may also be required for some conditionally exempt discharges.

In the SWMP, Caltrans identified uncontaminated pumped groundwater as being non-polluting, and identified BMPs for a few other discharges, including irrigation water, discharges from potable water sources, water line and hydrant flushing, and discharges or flows from emergency fire fighting activities. Caltrans also proposed that construction site dewatering of coffer dams, utility conduits, and excavations be considered conditionally exempt with the implementation of the "Removing Sediment from Dewatering Effluent" BMP. Presence of groundwater will likely be determined through the Geotechnical Report. The presence of contaminated groundwater or dewatering effluent may require additional NPDES permits, causing delays to the project. At press time, Caltrans is still discussing these proposals with the SWRCB as part of the overall SWMP negotiation and approval process. Until the SWMP is approved and adopted, existing dewatering permits and requirements are still in effect. Following SWMP adoption, RWQCBs may still require additional monitoring and reporting, prohibit discharges that are a significant source of pollutants, and issue separate NPDES permits for discharges beyond the scope of the Caltrans Permit. Check with your District Storm Water Coordinator for up-to-date information and specific requirements for your project.

2.3.6 Lead Contaminated Soils

On occasion, the environmental review process will identify project soils contaminated with lead. Usually, the contamination is the result of long-term aerial deposition from vehicle exhaust. Depending on the project location and the severity of the contamination, remediation requirements can range from incorporating the contaminated soil into embankment fills to complete removal. Specific remediation requirements must be provided to the contractor in the project contract documents (special provisions).

Caltrans has applied for and received variances from the California Department of Toxic Substances Control (DTSC) for the reuse of some soils that contain lead. Notification that projects involve soils that are subject to this variance shall be provided to the appropriate RWQCB(s) in writing 30 days

prior to advertisement for bids to allow a determination by the RWQCB(s) of the need for development of waste discharge requirements (WDRs). The Project Engineer should contact the Hazardous Waste Unit to obtain information on disposal of lead contaminated soils.

2.4 Preliminary Sizing for Permanent Treatment Control (Infiltration and Detention) Devices

Section 2.3 discussed treatment control device (infiltration and detention basins) requirements for storm water pollution control as identified by the environmental review process. Infiltration or detention devices may also be required to provide hydrologic control to prevent increased peak flow rates erosion in downstream watercourses as a result of increases in magnitude and frequency of storm flows.

If it is determined that infiltration or detention devices are required, start preliminary design to determine scope of work, right-of-way need, and cost estimates. The PE should coordinate with Landscape Architecture to determine aesthetic aspects of basin location and layout, and follow the respective working details in Appendix B for more detailed design guidelines.

When these permanent treatment control devices are required, consider the following:

- Availability of suitable land
- Peak discharge rate to downstream watercourses
- Maintenance access and costs. The District's Maintenance Division should be consulted when these devices are designed.
- Soil conditions appropriate for the BMP. Check with District Materials or Geotechnical units for project-specific soil conditions.

The design goal for hydrologic erosion control (streambank erosion control) is to limit the peak runoff rate for a 2-year storm to the pre-development rate, thus reducing in-stream channel erosion problems. Note that this design goal is different from, and in addition to, the flood control design requirements in Chapter 860 of the Highway Design Manual. Also, note that if the project is in the Lahontan region (Lake Tahoe Hydrologic Unit), the Permit has specific design requirements. Contact the District Hydraulic Unit for sizing of basins.

See the working details "Infiltration Basin" and "Detention Basin" in Appendix B for additional implementation guidance. The resulting facility size(s) should be used as a basis for developing cost estimates and right-of-way requirements for inclusion in the Project Report.

2.5 Planning Level Costs for Construction Site (Temporary) BMPs

The programmed project cost should include estimates for SWPPP or WPCP development and estimates to implement construction site BMPs during project construction as required by the Permit. The information provided below are guidelines that will assist designers in estimating the planning

level costs for the preparation of a SWPPP/WPCP and the costs to implement (i.e., construct, maintain, and remove) construction site (temporary) BMPs. These cost can then be added to the overall estimated cost of construction for the project, to come up with the final programming cost as shown below:

$$\begin{aligned} \text{Total Project Programming Cost} &= \text{Estimated cost of construction} \\ &+ \text{Estimated cost for SWPPP/WPCP Preparation} \\ &+ \text{Estimated cost for implementation of Construction Site BMPs} \end{aligned}$$

2.5.1 Estimating Cost for the Preparation of a SWPPP/WPCP

For a planning-level estimate, assume the typical preparation cost of a SWPPP to be about \$5,000 to \$10,000 (\$2,000 to \$4,000 for a WPCP), plus \$200 per each water pollution control sheet (the number of water pollution control sheets can be estimated by the using a number equal to the estimated number of drainage sheets in each construction staging plan set.)

2.5.2 Estimating Cost for Implementation of Construction Site BMPs

Planning-level cost for implementation of construction site (temporary) BMPs can be calculated as a percentage of total construction costs, depending on project location and type and complexity of project. In general, higher elevations and higher annual rainfall totals will result in higher construction site (temporary) BMP costs. Table 2-5 shows various types of projects that may require implementation of construction site BMPs, and a percentage of the estimated construction cost that should be added to the construction cost to come up with the total project programming cost.

Table 2-5

Planning-level Cost for Implementation of Construction Site BMPs	
Type of Project	% of Total Construction Cost
<i>Projects that involve work near 303d listed water body</i>	
Minor work such as resurfacing	3%
Work that will require structural (treatment) BMPs	4%
New facilities/renovations if TMDLs have been established (includes treatment BMPs)	6%-10%
<i>Construction of Highway projects</i>	
New project with a large percentage of structure work	2%
Freeway highway widening in rural areas	3%
Freeway/highway widening in urban areas	4%
Projects with considerable staging, borrow/fill sites and unbalance projects	5%
<i>Landscaping projects</i>	
Projects with irrigation repairs with little ground disturbance	4%
Landscape rehabilitation projects where ground disturbance is for irrigation trenches and some re-planting work	7%
Projects with new planting and irrigation that involve large areas of clearing and grubbing for new ground cover planting	10%
Projects (new and rehabilitation) that involve clearing and grubbing for ground cover planting that are immediately adjacent to water bodies	15%

The Project Engineer must also include supplemental funds to cover the 50/50 cost sharing for maintenance of construction site (temporary) BMPs during construction (see SSP 07-345.) This cost is estimated to be between 0.5% and 1% of total construction costs.

2.6 Incorporate Results into Final Report or Scoping Document

The information collected and developed during the planning phase will provide the basis for detailed design during the Plans, Specifications and Estimate (PS&E) phase. All data, decisions, and assumptions must be carefully documented and included in the final report or scoping document.